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Begin Translation:

**CLAIMS**

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[Claim 1] The cylinder body coordinated with fixed sides, such as a pillar, and the rod object with which a nose-of-cam side is inserted in possible [ frequent appearance ] in this cylinder body, It has the piston which are formed successively by the intermediate-shaft section of this rod object, and is installed inside possible [ sliding ] in a cylinder body. While the elongation side cut room and shrinkage side cut room of the same cross section which are divided in a cylinder body are mutually opened outside for free passage by this piston through the attenuation bulb of \*\*\*\*, the accumulator of \*\*\*\* is outside open for free passage. While the second pistons which slide on the point of a rod object within a cylinder body are formed successively, a pressure room is divided in a cylinder body with this second piston. The tension adjustment damper which a tonus object is coordinated with the end face of the rod object which is opened for free passage by the accumulator of the above [ this pressure room ], and projects in the exterior of a cylinder body, and is characterized by the bird clapper. [Claim 2] The cylinder body coordinated with fixed sides, such as a pillar, and the rod object with which a nose-of-cam side is inserted in possible [ frequent appearance ] in this cylinder body, It has the piston which are formed successively by the intermediate-shaft section of this rod object, and is installed inside possible [ sliding ] in a cylinder body. While the elongation side cut room and shrinkage side cut room of the same cross section which are divided in a cylinder body are mutually opened outside for free passage by this piston through the attenuation bulb of \*\*\*\*, the accumulator of \*\*\*\* is outside open for free passage. While the second pistons which slide on the point of a rod object within a cylinder body are formed successively, a pressure room is divided in a cylinder body and this pressure room is opened for free passage by the above-mentioned accumulator with this second piston The sub piston which is installed inside the end face circles of the rod object which projects in the exterior of a cylinder body possible [ sliding ], and divides a sub pressure room, Tension adjustment damper <BR> which it has the sub rod object with which noses of cam are formed successively by this sub piston, and a end face projects in the exterior of a rod object, and a sub pressure room is opened for free passage by the sub accumulator of \*\*\*\* outside, and a tonus object is coordinated with the end face of a sub rod object, and is characterized by the bird clapper.

## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to improvement of the tension adjustment damper which suppresses the tension change in a tonus object slack cable in a cable rack style.

[0002]

[Description of the Prior Art] It is supposed that the lifting and holding of the tension cable of formation will be carried out to cyclic [ of the pillar of this a large number book / which is \*\*\*\*(ed) so to speak at an inner circumference side ] with the pillar of the a large number book which was a cable rack style, for example, aligned cyclic and was set up when a cable dome was built.

[0003] At this time, a tension cable extends from the upper limit of each pillar used as a fixed side, is hung, and supposes that it will be coordinated with a cable and this presser-foot cable that extends from the lower part side of each pillar so that it may hang and may become a cable and the so-called pair.

[0004] And at this time, as shown in drawing 6 , it hangs with each pillar P, and between the cable C1 and the presser-foot cable C2, it has the tension adjustment damper D, and suppose that each cables C1 and C2 are always become tense with the shrinkage force in this tension adjustment damper D between. Incidentally, the sign Tc in drawing shows a tension cable.

[0005] On the other hand, at the time of an extension operation, when indicating in the official report of JP, 10-317731, A, as shown in drawing 7 , while this tension adjustment damper D is set as the piece rod type, becomes a contraction inclination by the air spring force by Accumulator A and becomes it tense about each cables C1 and C2, it is set up so that the oil of the oil sac slack pressure room R by the side of elongation may flow into Accumulator A through the attenuation bulb V.

[0006] So, since this tension adjustment damper D cannot make energy absorption at the time of a contraction operation, it can suppress a rapid tension change which may be discovered in each cables C1 and C2 at the time of this contraction operation.

[0007] Consequently, in the cable rack style using the above-mentioned tension adjustment damper D, it must stop, having to set each cables C1 and C2 as eye \*\* so to speak therefore, a roof load will increase, and there is fault to which it is requested to which that the meristele P should be formed strongly so to speak, and it makes cost quantity construction of the cable dome by the cable rack style etc.

[0008] The place which this invention was originated in view of the above-mentioned situation, and is made into the purpose does not invite elevation-ization of mischievous cost, carries out it, and it is a cable rack style, for example, is offering the tension adjustment damper which becomes the the best for the use in the case of building a cable dome etc.

[0009]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the composition of the tension adjustment damper by this invention with the first means The cylinder body coordinated with fixed sides, such as a pillar, and the rod object with which a nose-of-cam side is inserted in possible [ frequent appearance ] in this cylinder body, It has the piston which are formed successively by the intermediate-shaft section of this rod object, and is installed inside possible [ sliding

] in a cylinder body. While the elongation side cut room and shrinkage side cut room of the same cross section which are divided in a cylinder body are mutually opened outside for free passage by this piston through the attenuation bulb of \*\*\*\*, the accumulator of \*\*\*\* is outside open for free passage. While the second pistons which slide on the point of a rod object within a cylinder body are formed successively, a pressure room is divided in a cylinder body with this second piston. Suppose that it comes to coordinate a tonus object with the end face of the rod object which is opened for free passage by the accumulator of the above [ this pressure room ], and projects in the exterior of a cylinder body.

[0010] And the cylinder body coordinated with fixed sides, such as a pillar, with the second means, It has the piston by which nose-of-cam sides are formed successively by the intermediate-shaft section of the rod object inserted in possible [ frequent appearance ] and this rod object, and are installed inside possible [ sliding in a cylinder body ] in this cylinder body. While the elongation side cut room and shrinkage side cut room of the same cross section which are divided in a cylinder body are mutually opened outside for free passage by this piston through the attenuation bulb of \*\*\*\*, the accumulator of \*\*\*\* is outside open for free passage. While the second pistons which slide on the point of a rod object within a cylinder body are formed successively, a pressure room is divided in a cylinder body and this pressure room is opened for free passage by the above-mentioned accumulator with this second piston. The sub piston which is installed inside the end face circles of the rod object which projects in the exterior of a cylinder body possible [ sliding ], and divides a sub pressure room, It has the sub rod object with which noses of cam are formed successively by this sub piston, and a end face projects in the exterior of a rod object, and a sub pressure room is opened for free passage by the sub accumulator of \*\*\*\* outside, and suppose that it comes to coordinate a tonus object with the end face of a sub rod object.

[0011]

[Embodiments of the Invention] the tension adjustment damper D1 by the gestalt of operation shown in drawing 1 although this invention is explained below based on the gestalt of the illustrated operation -- tonus -- the body -- it is used as what hangs and suppresses the tension change in a cable C1 (refer to drawing 6 )

[0012] namely, the cylinder body 1 by which the tension adjustment damper D1 shown in drawing 1 is first coordinated with fixed sides, such as Pillar P (refer to drawing 6 ), and tonus -- the body -- it comes to have the piston 3 which are formed successively by the intermediate-shaft section of the rod object 2 in which a nose-of-cam side is inserted possible [ frequent appearance ], and this rod object 2, and is installed inside possible [ sliding in a cylinder body 1 ] in a cylinder body 1, hanging and being coordinated with a cable C1

[0013] And while the elongation side cut room R1 and the shrinkage side cut room R2 of the same cross section which are divided in a cylinder body 1 are mutually opened outside for free passage by the piston 3 through the attenuation bulb V of \*\*\*\*, it is supposed that the accumulator A of \*\*\*\* will come to be outside open for free passage.

[0014] So, if it is in this tension adjustment damper D1, an oil will go between the elongation side cut room R1 and the shrinkage side cut room R2, and it will surely realize from an oil surely passing the attenuation bulb V at this time at the predetermined attenuation of expansion and contraction of energy absorption, i.e., any direction, at the time of the expansion and contraction which the rod object 2 haunts to a cylinder body 1.

[0015] Moreover, when there is oil-temperature change and the volume in the elongation side cut room R1 and the shrinkage side cut room R2 changes, a part for this change can be compensated with Accumulator A.

[0016] Next, this tension adjustment damper D1 supposes that the pressure room R will be divided in a cylinder body 1 with this second piston 4 while the second pistons 4 which slide on the point which turns into the right end section all over drawing of the rod object 2 within a cylinder body 1 are formed successively.

[0017] and the end face which turns into a left end all over drawing of the rod object 2 which this pressure room R is opened for free passage by the above-mentioned accumulator A, and projects in the exterior of a cylinder body 1 -- tonus -- the body -- it hangs and it is supposed that a cable C1 will be coordinated

[0018] Incidentally, although it is set up with the gestalt of the operation to illustrate so that it may become the same as that of the cross section of the elongation side cut room R1 and the shrinkage side cut room R2, the cross section of the pressure room R may be set up so that it may differ from the cross section of the elongation side cut room R1 and the shrinkage side cut room R2 as long as it carries out from the place where this pressure room R functions.

[0019] So, if it is in this tension adjustment damper D1, it will set in the contraction inclination for the rod object 2 to be set namely, absorbed in the inclination for the pressure room R to always expand with Accumulator A, in a cylinder body 1 by the air spring force of Accumulator A, the cooperation with the end face of the rod object 2 will hang, and it will always be become tense about a cable C1.

[0020] Moreover, it will hang, external force will act on a cable C1, the pressure room R will be contracted at the time of the extension operation out of which the rod object 2 escapes from and comes out of a cylinder body 1, and an oil will come to flow into Accumulator A, therefore energy absorption by Accumulator A will also be realized.

[0021] in case the above-mentioned tension adjustment damper D1 coordinates this with Pillar P, it is shown in drawing 1 -- a state -- a cylinder body 1 coordinates with Pillar P, been in the so-called maximum contraction state, it hangs to since then at the end face of the rod object 2, a cable C1 is coordinated, and it changes into the state where pulled out the rod object 2 out of the cylinder body 1, and degree extension was carried out in the middle, as [ show / in drawing 2 ]

[0022] consequently, when the external force which hangs and acts on a cable C1 from this so-called attachment state, for example increases While this rod object 2 that it hangs [ object ] and makes a cable C1 coordinate comes to escape from and come out out of a cylinder body 1 and the oil which flows out of the elongation side cut room R1 to contract flows into the shrinkage side cut room R2 through the attenuation bulb V at this time The pressure room R will be contracted and the oil from this pressure room R will flow into Accumulator A.

[0023] Therefore, predetermined energy absorption will be embodied by the attenuation by an oil passing the attenuation bulb V, and the gas spring effect by an oil flowing into Accumulator A.

[0024] And when the external force which hangs and acts on a cable C1 decreases, the pressure room R will expand by the air spring force by Accumulator A, and the oil from the shrinkage side cut room R2 will flow into the elongation side cut room R1 through the attenuation bulb V at this time.

[0025] So, while it hangs by the air spring force by Accumulator A and the slack in a cable C1 is prevented, the large tension change by predetermined energy absorption being embodied, hanging especially and a cable C1 loosening by the

attenuation by an oil passing the attenuation bulb V, can be suppressed effectively. [0026] Next, the tension adjustment damper D2 of the gestalt of operation shown in drawing 4 is used as what suppresses the tension change in the tonus object slack presser-foot cable C2 (refer to drawing 6 ).

[0027] That is, although said tension adjustment damper D1 suppresses tension change [ in / a cable C1 / it hangs and ] which functions as lifting the tension cable Tc, it suppresses the tension change in the presser-foot cable C2 which functions as hanging this tension adjustment damper D2, it becoming a cable C1 and a pair, and pressing down the tension cable Tc from a lower part.

[0028] This tension adjustment damper D2 so, fundamentally It is what is constituted like the tension adjustment damper D1 shown in said drawing 1 . The cylinder body 1 coordinated with fixed sides, such as Pillar P, and the rod object 2 with which a nose-of-cam side is inserted in possible [ frequent appearance ] in this cylinder body 1, It has the piston 3 which are formed successively by the intermediate-shaft section of this rod object 2, and is installed inside possible [ sliding ] in a cylinder body 1. While the elongation side cut room R1 and the shrinkage side cut room R2 of the same cross section which are divided in a cylinder body 1 are mutually opened outside for free passage by this piston 3 through the attenuation bulb V of \*\*\*\*, the accumulator A of \*\*\*\* is outside open for free passage. While the second pistons 4 which slide on the point of the rod object 2 within a cylinder body 1 are formed successively, the pressure room R is divided in a cylinder body 1 with this second piston 4, and it is supposed that this pressure room R is opened for free passage by the above-mentioned accumulator A.

[0029] This tension adjustment damper D2 in the above-mentioned composition And in addition, the sub piston 5 which is installed inside the end face circles which serve as the left end section all over drawing of the rod object 2 which projects in the exterior of a cylinder body 1 possible [ sliding ], and divides the sub pressure room R3, It has the sub rod object 6 with which the end face which noses of cam are formed successively by this sub piston 5, and turns into a left end all over drawing projects in the exterior of the rod object 2. It is supposed that the tonus object slack presser-foot cable C2 will be coordinated with the end face which the sub pressure room R3 is opened for free passage by the sub accumulator A1 of \*\*\*\* outside, and turns into a left end all over drawing of the sub rod object 6.

[0030] At this time, the cross section in the sub pressure room R3 of being set up so that it may become smaller than the cross section in said pressure room R is natural, and the encapsulated gas pressure in the sub accumulator A1 is set up so that the encapsulated-gas-pressure \*\*\*\* thrust in said accumulator A may become small.

[0031] So, as the sub rod object 6 falls out out of the rod object 2 first at the time of the so-called extension operation, and it comes to come out, if it is in the tension adjustment damper D2 by the gestalt of this operation, and the sub rod object 6 shows drawing 5 , when it escapes out of the rod object 2 more than it and stops coming out, as it is similarly shown in drawing 5 , the rod object 2 falls out out of a cylinder body 1, and it comes to come out.

[0032] Moreover, if the rod object 2 comes to be absorbed in a cylinder body 1 and the rod object 2 may stop absorbing more than it if it is in this tension adjustment damper D2 when contracting from an extension state, the sub rod object 6 will come to be absorbed in the rod object 2.

[0033] Therefore, although this tension adjustment damper D1 does not contract further in the tension adjustment damper D1 shown in said drawing 1 after the rod

object 2 finishes being absorbed in a cylinder body 1 at the time of a contraction operation, the further contraction operation after the rod object 2 finishes being absorbed in a cylinder body 1 is attained in the tension adjustment damper D2 shown in this drawing 4.

[0034] And if it is in this tension adjustment damper D2, although it is made to be the same as that of the tension adjustment damper D1 shown in said drawing 1 in coordinating this with Pillar P after pulling out the sub rod object 6 out of the rod object 2 and changing into the maximum extension state, as shown in drawing 5, when pressing down to the end face of the sub rod object 6 and coordinating a cable C2 -- in addition -- and it changes into the state where pulled out the rod object 2 out of the cylinder body 1, and degree extension was carried out in the middle

[0035] consequently, when the external force which acts on the presser-foot cable C2 increases from this so-called attachment state, for example The rod object 2 which this presser-foot cable C2 coordinates through the sub rod object 6 and the sub piston 5 comes to escape from and come out out of a cylinder body 1. At this time While the oil which flows out of the elongation side cut room R1 to contract flows into the shrinkage side cut room R2 through the attenuation bulb V, the pressure room R will be contracted and the oil from this pressure room R will flow into Accumulator A.

[0036] Therefore, predetermined energy absorption will be embodied by the attenuation by an oil passing the attenuation bulb V, and the gas spring effect by an oil flowing into Accumulator A.

[0037] And when the external force which acts on the presser-foot cable C2 decreases, the rod object 2 comes to be absorbed in a cylinder body 1, while the oil which flows out of the shrinkage side cut room R2 contracted at this time flows into the elongation side cut room R1 through the attenuation bulb V, the pressure room R will expand and the oil from Accumulator A will flow into the pressure room R.

[0038] Therefore, while energy absorption predetermined by the attenuation by an oil passing the attenuation bulb V is embodied, it will be prevented that press down by the air spring force by Accumulator A, and the so-called slack occurs on a cable C2.

[0039] And when it presses down further and a cable C2 slackens after the rod object 2 finishes being absorbed in a cylinder body 1, it comes to be absorbed in the rod object 2, and the sub rod object 5 will press down by the air spring force by the sub accumulator A1, and will suppress the tension change in a cable C2.

[0040] So, the tension adjustment damper D2 shown in this drawing 4 becomes the the best for considering as the tension adjustment damper D1 shown in said drawing 1, and the so-called pair, and becoming it tense about the tension cable Tc.

[0041]

[Effect of the Invention] If it is in this invention, since an oil surely passes an attenuation bulb at the time of a flexible operation, the tension change in the tonus object which consists of a cable can be suppressed effectively. so, as mentioned above, for example When building a cable dome etc. at cable rack guard, a roof load will be increased, or forming a pillar strongly will carry out [ be / it / necessary / to set a tonus object as eye \*\* therefore / so to speak ] by not being requested, and cheap-ization of cost will be enabled.

[0042] And the sub piston which is installed inside the end face circles of the rod

object which projects in the exterior of a cylinder body possible [ sliding ], and divides a sub pressure room, It has the sub rod object with which noses of cam are formed successively by this sub piston, and a end face projects in the exterior of a rod object. In a sub pressure room's being opened for free passage by the sub accumulator of \*\*\*\* outside and coming to coordinate a tonus object with the end face of a sub rod object After a rod object finishes being absorbed in a cylinder body at the time of the contraction operation, when a tonus object slackens further, a sub rod object will come to be absorbed in the rod inside of the body, and can suppress the tension change in a tonus object by the air spring force by the sub accumulator.

[0043] Consequently, according to this invention, do not invite elevation-ization of mischievous cost and it is carried out, and it is a cable rack style, for example, becomes the the best for the use in the case of building a cable dome etc., and there is an advantage which can expect improvement in the versatility.

## TECHNICAL FIELD

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[The technical field to which invention belongs] This invention relates to improvement of the tension adjustment damper which suppresses the tension change in a strain object slack cable in a cable rack style.

## EFFECT OF THE INVENTION

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[Effect of the Invention] as mentioned above, if it is in this invention, since an oil surely passes an attenuation bulb at the time of a flexible operation, the tension change in the strain object which consists of a cable can be suppressed effectively -- \*\*\*\*\* -- so . For example, when building a cable dome etc. at cable rack guard, a roof load will be increased, or forming a pillar strongly will carry out [ be / it / necessary / to set a strain object as eye \*\* therefore / so to speak ] by not being requested, and cheap-ization of cost will be enabled.

[0042] And the sub piston which is installed inside the end face circles of the rod object which projects in the exterior of a cylinder body possible [ sliding ], and divides a sub pressure room, It has the sub rod object with which noses of cam are formed successively by this sub piston, and a end face projects in the exterior of a rod object. In a sub pressure room's being opened for free passage by the sub accumulator of \*\*\*\* outside and coming to coordinate a strain object with the end face of a sub rod object After a rod object finishes being absorbed in a cylinder body at the time of the contraction operation, when a strain object slackens further, a sub rod object will come to be absorbed in the rod inside of the body, and can suppress the tension change in a strain object by the air spring force by the sub accumulator.

[0043] Consequently, according to this invention, do not invite elevation-ization of mischievous cost and it is carried out, and it is a cable rack style, for example, becomes the the best for the use in the case of building a cable dome etc., and there is an advantage which can expect improvement in the versatility.

## TECHNICAL PROBLEM

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[Description of the Prior Art] It is supposed that the lifting and holding of the tension cable of formation will be carried out to cyclic [ of the pillar of this a large number

book / which is \*\*\*\*(ed) so to speak at an inner circumference side ] with the pillar of the a large number book which was a cable rack style, for example, aligned cyclic and was set up when a cable dome was built.

[0003] At this time, a tension cable extends from the upper limit of each pillar used as a fixed side, is hung, and supposes that it will be coordinated with a cable and this presser-foot cable that extends from the lower part side of each pillar so that it may hang and may become a cable and the so-called pair.

[0004] And at this time, as shown in drawing 6 , it hangs with each pillar P, and between the cable C1 and the presser-foot cable C2, it has the tension adjustment damper D, and suppose that each cables C1 and C2 are always become tense with the shrinkage force in this tension adjustment damper D between. Incidentally, the sign Tc in drawing shows a tension cable.

[0005] On the other hand, at the time of an extension operation, when indicating in the official report of JP,10-317731,A, as shown in drawing 7 , while this tension adjustment damper D is set as the piece rod type, becomes a contraction inclination by the air spring force by Accumulator A and becomes it tense about each cables C1 and C2, it is set up so that the oil of the oil sac slack pressure room R by the side of elongation may flow into Accumulator A through the attenuation bulb V.

[0006] So, since this tension adjustment damper D cannot make energy absorption at the time of a contraction operation, it can suppress a rapid tension change which may be discovered in each cables C1 and C2 at the time of this contraction operation.

[0007] Consequently, in the cable rack style using the above-mentioned tension adjustment damper D, it must stop, having to set each cables C1 and C2 as eye \*\* so to speak therefore, a roof load will increase, and there is fault to which it is requested to which that the meristele P should be formed strongly so to speak, and it makes cost quantity construction of the cable dome by the cable rack style etc.

[0008] The place which this invention was originated in view of the above-mentioned situation, and is made into the purpose does not invite elevation-ization of mischievous cost, carries out it, and it is a cable rack style, for example, is offering the tension adjustment damper which becomes the best for the use in the case of building a cable dome etc.

## MEANS

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[Means for Solving the Problem] In order to attain the above-mentioned purpose, the composition of the tension adjustment damper by this invention with the first means The cylinder body coordinated with fixed sides, such as a pillar, and the rod object with which a nose-of-cam side is inserted in possible [ frequent appearance ] in this cylinder body, It has the piston which are formed successively by the intermediate-shaft section of this rod object, and is installed inside possible [ sliding ] in a cylinder body. While the elongation side cut room and shrinkage side cut room of the same cross section which are divided in a cylinder body are mutually opened outside for free passage by this piston through the attenuation bulb of \*\*\*\*, the accumulator of \*\*\*\* is outside open for free passage. While the second pistons which slide on the point of a rod object within a cylinder body are formed successively, a pressure room is divided in a cylinder body with this second piston. Suppose that it comes to coordinate a tonus object with the end face of the rod object which is opened for free passage by the accumulator of the above [ this



pressure room ], and projects in the exterior of a cylinder body.

[0010] And the cylinder body coordinated with fixed sides, such as a pillar, with the second means, It has the piston by which nose-of-cam sides are formed successively by the intermediate-shaft section of the rod object inserted in possible [ frequent appearance ] and this rod object, and are installed inside possible [ sliding in a cylinder body ] in this cylinder body. While the elongation side cut room and shrinkage side cut room of the same cross section which are divided in a cylinder body are mutually opened outside for free passage by this piston through the attenuation bulb of \*\*\*\*, the accumulator of \*\*\*\* is outside open for free passage. While the second pistons which slide on the point of a rod object within a cylinder body are formed successively, a pressure room is divided in a cylinder body and this pressure room is opened for free passage by the above-mentioned accumulator with this second piston The sub piston which is installed inside the end face circles of the rod object which projects in the exterior of a cylinder body possible [ sliding ], and divides a sub pressure room, It has the sub rod object with which noses of cam are formed successively by this sub piston, and a end face projects in the exterior of a rod object, and a sub pressure room is opened for free passage by the sub accumulator of \*\*\*\* outside, and suppose that it comes to coordinate a tonus object with the end face of a sub rod object.

[0011]

[Embodiments of the Invention] the tension adjustment damper D1 by the gestalt of operation shown in drawing 1 although this invention is explained below based on the gestalt of the illustrated operation -- tonus -- the body -- it is used as what hangs and suppresses the tension change in a cable C1 (refer to drawing 6 )

[0012] namely, the cylinder body 1 by which the tension adjustment damper D1 shown in drawing 1 is first coordinated with fixed sides, such as Pillar P (refer to drawing 6 ), and tonus -- the body -- it comes to have the piston 3 which are formed successively by the intermediate-shaft section of the rod object 2 in which a nose-of-cam side is inserted possible [ frequent appearance ], and this rod object 2, and is installed inside possible [ sliding in a cylinder body 1 ] in a cylinder body 1, hanging and being coordinated with a cable C1

[0013] And while the elongation side cut room R1 and the shrinkage side cut room R2 of the same cross section which are divided in a cylinder body 1 are mutually opened outside for free passage by the piston 3 through the attenuation bulb V of \*\*\*\*, it is supposed that the accumulator A of \*\*\*\* will come to be outside open for free passage.

[0014] So, if it is in this tension adjustment damper D1, an oil will go between the elongation side cut room R1 and the shrinkage side cut room R2, and it will surely realize from an oil surely passing the attenuation bulb V at this time at the predetermined attenuation of expansion and contraction of energy absorption, i.e., any direction, at the time of the expansion and contraction which the rod object 2 haunts to a cylinder body 1.

[0015] Moreover, when there is oil-temperature change and the volume in the elongation side cut room R1 and the shrinkage side cut room R2 changes, a part for this change can be compensated with Accumulator A.

[0016] Next, this tension adjustment damper D1 supposes that the pressure room R will be divided in a cylinder body 1 with this second piston 4 while the second pistons 4 which slide on the point which turns into the right end section all over drawing of the rod object 2 within a cylinder body 1 are formed successively.

[0017] and the end face which turns into a left end all over drawing of the rod

object 2 which this pressure room R is opened for free passage by the above-mentioned accumulator A, and projects in the exterior of a cylinder body 1 -- tonus -- the body -- it hangs and it is supposed that a cable C1 will be coordinated [0018] Incidentally, although it is set up with the gestalt of the operation to illustrate so that it may become the same as that of the cross section of the elongation side cut room R1 and the shrinkage side cut room R2, the cross section of the pressure room R may be set up so that it may differ from the cross section of the elongation side cut room R1 and the shrinkage side cut room R2 as long as it carries out from the place where this pressure room R functions.

[0019] So, if it is in this tension adjustment damper D1, it will set in the contraction inclination for the rod object 2 to be set namely, absorbed in the inclination for the pressure room R to always expand with Accumulator A, in a cylinder body 1 by the air spring force of Accumulator A, the cooperation with the end face of the rod object 2 will hang, and it will always be become tense about a cable C1.

[0020] Moreover, it will hang, external force will act on a cable C1, the pressure room R will be contracted at the time of the extension operation out of which the rod object 2 escapes from and comes out of a cylinder body 1, and an oil will come to flow into Accumulator A, therefore energy absorption by Accumulator A will also be realized.

[0021] in case the above-mentioned tension adjustment damper D1 coordinates this with Pillar P, it is shown in drawing 1 -- a state -- a cylinder body 1 coordinates with Pillar P, been in the so-called maximum contraction state, it hangs to since then at the end face of the rod object 2, a cable C1 is coordinated, and it changes into the state where pulled out the rod object 2 out of the cylinder body 1, and degree extension was carried out in the middle, as [ show / in drawing 2 ]

[0022] consequently, when the external force which hangs and acts on a cable C1 from this so-called attachment state, for example increases While this rod object 2 that it hangs [ object ] and makes a cable C1 coordinate comes to escape from and come out out of a cylinder body 1 and the oil which flows out of the elongation side cut room R1 to contract flows into the shrinkage side cut room R2 through the attenuation bulb V at this time The pressure room R will be contracted and the oil from this pressure room R will flow into Accumulator A.

[0023] Therefore, predetermined energy absorption will be embodied by the attenuation by an oil passing the attenuation bulb V, and the gas spring effect by an oil flowing into Accumulator A.

[0024] And when the external force which hangs and acts on a cable C1 decreases, the pressure room R will expand by the air spring force by Accumulator A, and the oil from the shrinkage side cut room R2 will flow into the elongation side cut room R1 through the attenuation bulb V at this time.

[0025] So, while it hangs by the air spring force by Accumulator A and the slack in a cable C1 is prevented, the large tension change by predetermined energy absorption being embodied, hanging especially and a cable C1 loosening by the attenuation by an oil passing the attenuation bulb V, can be suppressed effectively.

[0026] Next, the tension adjustment damper D2 of the gestalt of operation shown in drawing 4 is used as what suppresses the tension change in the tonus object slack presser-foot cable C2 (refer to drawing 6 ).

[0027] That is, although said tension adjustment damper D1 suppresses tension change [ in / a cable C1 / it hangs and ] which functions as lifting the tension cable Tc, it suppresses the tension change in the presser-foot cable C2 which functions as hanging this tension adjustment damper D2, it becoming a cable C1 and a pair,

and pressing down the tension cable Tc from a lower part.

[0028] This tension adjustment damper D2 so, fundamentally It is what is constituted like the tension adjustment damper D1 shown in said drawing 1 . The cylinder body 1 coordinated with fixed sides, such as Pillar P, and the rod object 2 with which a nose-of-cam side is inserted in possible [ frequent appearance ] in this cylinder body 1, It has the piston 3 which are formed successively by the intermediate-shaft section of this rod object 2, and is installed inside possible [ sliding ] in a cylinder body 1. While the elongation side cut room R1 and the shrinkage side cut room R2 of the same cross section which are divided in a cylinder body 1 are mutually opened outside for free passage by this piston 3 through the attenuation bulb V of \*\*\*\*, the accumulator A of \*\*\*\* is outside open for free passage. While the second pistons 4 which slide on the point of the rod object 2 within a cylinder body 1 are formed successively, the pressure room R is divided in a cylinder body 1 with this second piston 4, and it is supposed that this pressure room R is opened for free passage by the above-mentioned accumulator A.

[0029] This tension adjustment damper D2 in the above-mentioned composition And in addition, the sub piston 5 which is installed inside the end face circles which serve as the left end section all over drawing of the rod object 2 which projects in the exterior of a cylinder body 1 possible [ sliding ], and divides the sub pressure room R3, It has the sub rod object 6 with which the end face which noses of cam are formed successively by this sub piston 5, and turns into a left end all over drawing projects in the exterior of the rod object 2. It is supposed that the tonus object slack presser-foot cable C2 will be coordinated with the end face which the sub pressure room R3 is opened for free passage by the sub accumulator A1 of \*\*\*\* outside, and turns into a left end all over drawing of the sub rod object 6.

[0030] At this time, the cross section in the sub pressure room R3 of being set up so that it may become smaller than the cross section in said pressure room R is natural, and the encapsulated gas pressure in the sub accumulator A1 is set up so that the encapsulated-gas-pressure \*\*\*\* thrust in said accumulator A may become small.

[0031] So, as the sub rod object 6 falls out out of the rod object 2 first at the time of the so-called extension operation, and it comes to come out, if it is in the tension adjustment damper D2 by the gestalt of this operation, and the sub rod object 6 shows drawing 5 , when it escapes out of the rod object 2 more than it and stops coming out, as it is similarly shown in drawing 5 , the rod object 2 falls out out of a cylinder body 1, and it comes to come out.

[0032] Moreover, if the rod object 2 comes to be absorbed in a cylinder body 1 and the rod object 2 may stop absorbing more than it if it is in this tension adjustment damper D2 when contracting from an extension state, the sub rod object 6 will come to be absorbed in the rod object 2.

[0033] Therefore, although this tension adjustment damper D1 does not contract further in the tension adjustment damper D1 shown in said drawing 1 after the rod object 2 finishes being absorbed in a cylinder body 1 at the time of a contraction operation, the further contraction operation after the rod object 2 finishes being absorbed in a cylinder body 1 is attained in the tension adjustment damper D2 shown in this drawing 4 .

[0034] And if it is in this tension adjustment damper D2, although it is made to be the same as that of the tension adjustment damper D1 shown in said drawing 1 in coordinating this with Pillar P after pulling out the sub rod object 6 out of the rod object 2 and changing into the maximum extension state, as shown in drawing 5 ,

when pressing down to the end face of the sub rod object 6 and coordinating a cable C2 -- in addition -- and it changes into the state where pulled out the rod object 2 out of the cylinder body 1, and degree extension was carried out in the middle

[0035] consequently, when the external force which acts on the presser-foot cable C2 increases from this so-called attachment state, for example The rod object 2 which this presser-foot cable C2 coordinates through the sub rod object 6 and the sub piston 5 comes to escape from and come out out of a cylinder body 1. At this time While the oil which flows out of the elongation side cut room R1 to contract flows into the shrinkage side cut room R2 through the attenuation bulb V, the pressure room R will be contracted and the oil from this pressure room R will flow into Accumulator A.

[0036] Therefore, predetermined energy absorption will be embodied by the attenuation by an oil passing the attenuation bulb V, and the gas spring effect by an oil flowing into Accumulator A.

[0037] And when the external force which acts on the presser-foot cable C2 decreases, the rod object 2 comes to be absorbed in a cylinder body 1, while the oil which flows out of the shrinkage side cut room R2 contracted at this time flows into the elongation side cut room R1 through the attenuation bulb V, the pressure room R will expand and the oil from Accumulator A will flow into the pressure room R.

[0038] Therefore, while energy absorption predetermined by the attenuation by an oil passing the attenuation bulb V is embodied, it will be prevented that press down by the air spring force by Accumulator A, and the so-called slack occurs on a cable C2.

[0039] And when it presses down further and a cable C2 slackens after the rod object 2 finishes being absorbed in a cylinder body 1, it comes to be absorbed in the rod object 2, and the sub rod object 5 will press down by the air spring force by the sub accumulator A1, and will suppress the tension change in a cable C2.

[0040] So, the tension adjustment damper D2 shown in this drawing 4 becomes the the best for considering as the tension adjustment damper D1 shown in said drawing 1 , and the so-called pair, and becoming it tense about the tension cable Tc.

## DESCRIPTION OF DRAWINGS

[Drawing 1] It is drawing showing theoretically the tension adjustment damper by the gestalt of 1 implementation of this invention.

[Drawing 2] The tension adjustment damper of drawing 1 is drawing showing similarly the state where degree extension was carried out in the middle with drawing 1 .

[Drawing 3] The tension adjustment damper of drawing 1 is drawing showing similarly the state where it maximum-elongated with drawing 1 .

[Drawing 4] It is drawing showing similarly the tension adjustment damper by the gestalt of other operations with drawing 1 .

[Drawing 5] The tension adjustment damper of drawing 4 is the partial diagrammatic view showing the state where it elongated slightly.

[Drawing 6] It is the partial diagrammatic view showing an example of a cable rack style theoretically.

[Drawing 7] It is drawing showing theoretically the tension adjustment damper as a

conventional example shown in drawing 6 .

[Description of Notations]

1 Cylinder Body

2 Rod Object

3 Piston

4 Second Piston

5 Sub Piston

6 Sub Rod Object

A Accumulator

A1 Sub accumulator

C Check valve

C1 tonus -- the body -- hanging -- cable

C2 Tonus object slack presser-foot cable

D1, D2 Tension adjustment damper

R Pressure room

R1 Elongation side cut room

R2 Shrinkage side cut room

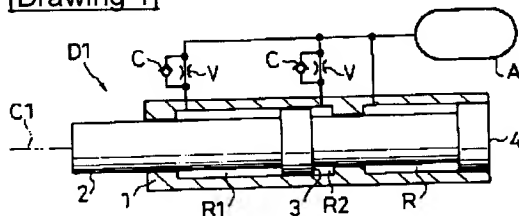
R3 Sub pressure room

Tc Tension cable

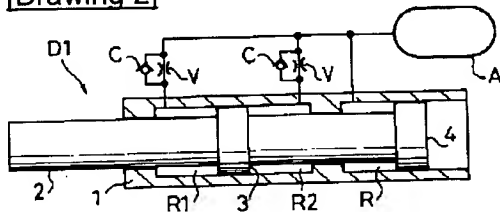
V Attenuation bulb

DRAWINGS

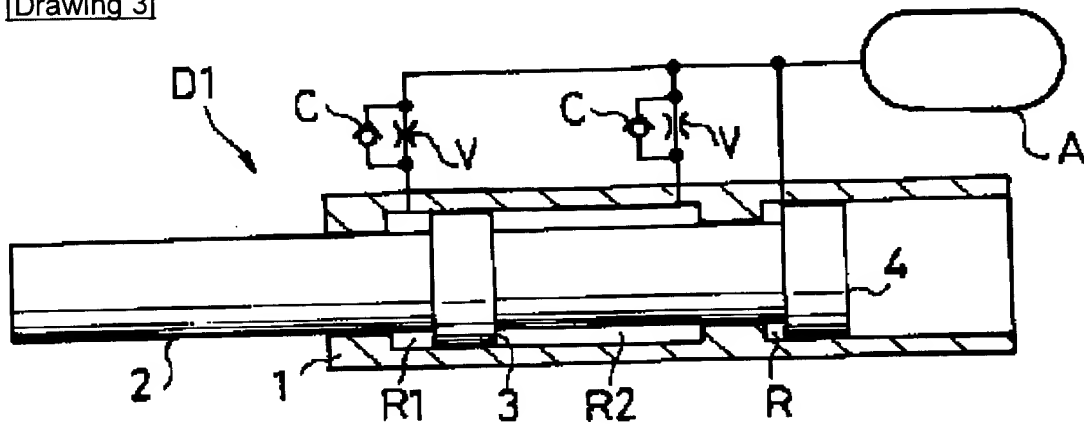
[Drawing 1]



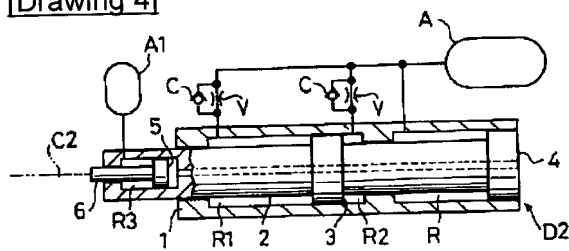
[Drawing 2]



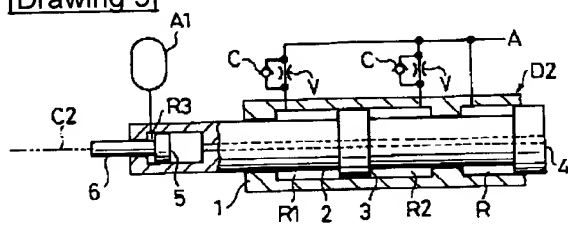
[Drawing 3]



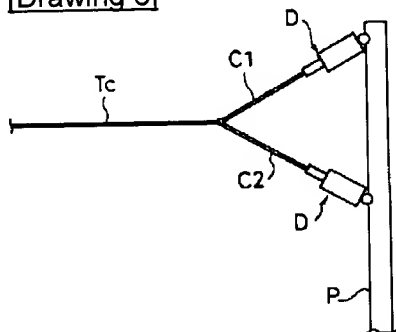
[Drawing 4]



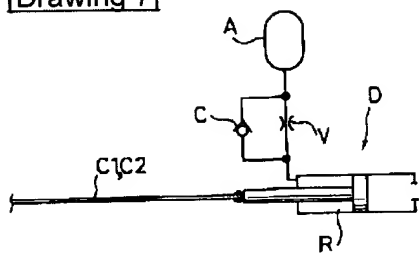
[Drawing 5]



[Drawing 6]



[Drawing 7]



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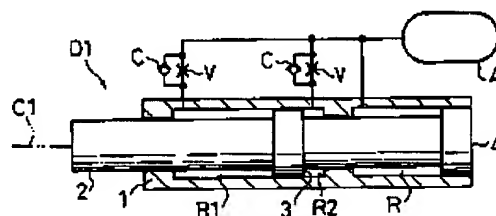
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(54) 【発明の名称】 張力調整ダンパ

(57) 【要約】

【課題】 いたずらなコストの上昇化を招来せずして、ケーブル架構で、たとえば、ケーブルドームなどを構築する場合の利用に最適とする。

【解決手段】 柱Pなどの固定側に連繋されるシリンダ体1と、このシリンダ体1内に先端側が出没可能に挿通されるロッド体2と、このロッド体2の中間軸部に連設されてシリンダ体1内に摺動可能に収容されるピストン3とを有し、このピストン3によってシリンダ体1内に区画される同一断面積の伸び側油室R1および縮み側油室R2が外部に配在の減衰バルブVを介して相互に連通されると共に外部に配在のアクチュレータAに連通され、ロッド体2の先端部にシリンダ体1内で摺動する第二ピストン4が連設されると共にこの第二ピストン4によってシリンダ体1内に圧力室Rが区画され、この圧力室Rが上記のアクチュレータAに連通され、かつ、シリンダ体1の外部に突出するロッド体2の基端に緊張体たるケーブルC1が連繋される。





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## 【特許請求の範囲】

【請求項1】 柱などの固定側に連繋されるシリンダ体と、このシリンダ体内に先端側が出没可能に挿通されるロッド体と、このロッド体の中間軸部に連設されてシリンダ体内に摺動可能に収装されるピストンとを有し、このピストンによってシリンダ体内に区画される同一断面積の伸び側油室および縮み側油室が外部に配在の減衰バルブを介して相互に連通されると共に外部に配在のアクチュムレータに連通され、ロッド体の先端部にシリンダ体内で摺動する第二ピストンが連設されると共にこの第二ピストンによってシリンダ体内に圧力室が区画され、この圧力室が上記のアクチュムレータに連通され、かつ、シリンダ体の外部に突出するロッド体の基端に緊張体が連繋されてなることを特徴とする張力調整ダンパ

【請求項2】 柱などの固定側に連繋されるシリンダ体と、このシリンダ体内に先端側が出没可能に挿通されるロッド体と、このロッド体の中間軸部に連設されてシリンダ体内に摺動可能に収装されるピストンとを有し、このピストンによってシリンダ体内に区画される同一断面積の伸び側油室および縮み側油室が外部に配在の減衰バルブを介して相互に連通されると共に外部に配在のアクチュムレータに連通され、ロッド体の先端部にシリンダ体内で摺動する第二ピストンが連設されると共にこの第二ピストンによってシリンダ体内に圧力室が区画され、この圧力室が上記のアクチュムレータに連通される一方で、シリンダ体の外部に突出するロッド体の基端部に摺動可能に収装されてサブ圧力室を区画するサブピストンと、このサブピストンに先端が連設されて基端がロッド体の外部に突出するサブロッド体とを有し、サブ圧力室が外部に配在のサブアクチュムレータに連通され、かつ、サブロッド体の基端に緊張体が連繋されてなることを特徴とする張力調整ダンパ

## 【発明の詳細な説明】

【0001】

【発明の属する技術分野】この発明は、ケーブル架構において、緊張体たるケーブルにおける張力変動を抑制する張力調整ダンパの改良に関する。

【0002】

【従来技術とその問題点】ケーブル架構で、たとえば、ケーブルドームを構築する場合には、輪状に整列されて立設された多数本の柱によって、この多数本の柱の言わば内周側に配在される輪状に形成のテンションケーブルを吊持するとしている。

【0003】このとき、テンションケーブルは、固定側となる各柱の上端から延在される吊りケーブルと、この吊りケーブルといわゆる対になるように各柱の下方側から延在される押えケーブルとに連繋されるとしている。

【0004】そして、このとき、図6に示すように、各柱Pと吊りケーブルC1および押えケーブルC2との間には、張力調整ダンパDを有して、この張力調整ダ

ンパDにおける収縮力で各ケーブルC1、C2を常時緊張するとしている。ちなみに、図中の符号Tcは、テンションケーブルを示す。

【0005】一方、この張力調整ダンパDは、たとえば、特開平10-317731号の公報に開示するところでは、図7に示すように、片ロッド型に設定されていて、アクチュムレータAによるエアばね力で収縮傾向になって各ケーブルC1、C2を緊張する一方で、伸長作動時には、伸び側の油室たる圧力室Rの油が減衰バルブVを介してアクチュムレータAに流入するように設定されている。

【0006】それゆえ、この張力調整ダンパDは、収縮作動時にはエネルギー吸収をなし得ないから、この収縮作動時に各ケーブルC1、C2において発現されることがある急激な張力変動を抑制し得ないことになる。

【0007】その結果、上記の張力調整ダンパDを利用するケーブル架構においては、各ケーブルC1、C2を言わば太目に設定しなければならなくなり、したがって、屋根荷重が増大されることになり、その分柱Pを言わば頑丈に形成することが要請されて、ケーブル架構によるケーブルドームなどの構築をコスト高にする不具合がある。

【0008】この発明は、上記した事情を鑑みて創案されたもので、その目的とするところは、いたずらなコストの上昇を招来せずして、ケーブル架構で、たとえば、ケーブルドームなどを構築する場合の利用に最適となる張力調整ダンパを提供することである。

【0009】

【課題を解決するための手段】上記した目的を達成するために、この発明による張力調整ダンパの構成を、第一の手段では、柱などの固定側に連繋されるシリンダ体と、このシリンダ体内に先端側が出没可能に挿通されるロッド体と、このロッド体の中間軸部に連設されてシリンダ体内に摺動可能に収装されるピストンとを有し、このピストンによってシリンダ体内に区画される同一断面積の伸び側油室および縮み側油室が外部に配在の減衰バルブを介して相互に連通されると共に外部に配在のアクチュムレータに連通され、ロッド体の先端部にシリンダ体内で摺動する第二ピストンが連設されると共にこの第二ピストンによってシリンダ体内に圧力室が区画され、この圧力室が上記のアクチュムレータに連通され、かつ、シリンダ体の外部に突出するロッド体の基端に緊張体が連繋されてなるとする。

【0010】そして、第二の手段では、柱などの固定側に連繋されるシリンダ体と、このシリンダ体内に先端側が出没可能に挿通されるロッド体と、このロッド体の中間軸部に連設されてシリンダ体内に摺動可能に収装されるピストンとを有し、このピストンによってシリンダ体内に区画される同一断面積の伸び側油室および縮み側油室が外部に配在の減衰バルブを介して相互に連通される

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と共に外部に配在のアキュムレータに連通され、ロッド体の先端部にシリンダ体内で摺動する第二ピストンが連設されると共にこの第二ピストンによってシリンダ体内に圧力室が区画され、この圧力室が上記のアキュムレータに連通される一方で、シリンダ体の外部に突出するロッド体の基端部に摺動可能に収装されてサブ圧力室を区画するサブピストンと、このサブピストンに先端が連設されて基端がロッド体の外部に突出するサブロッド体とを有し、サブ圧力室が外部に配在のサブアキュムレータに連通され、かつ、サブロッド体の基端に緊張体が連設されてなるとする。

【0011】

【発明の実施の形態】以下に、図示した実施の形態に基づいて、この発明を説明するが、図1に示す実施の形態による張力調整ダンパD1は、緊張体たる吊りケーブルC1（図6参照）における張力変動を抑制するものとして利用される。

【0012】すなわち、まず、図1に示す張力調整ダンパD1は、柱P（図6参照）などの固定側に連設されるシリンダ体1と、緊張体たる吊りケーブルC1に連設されながら、シリンダ体1内に先端側が出没可能に挿通されるロッド体2と、このロッド体2の中間軸部に連設されてシリンダ体1内に摺動可能に収装されるピストン3とを有してなる。

【0013】そして、ピストン3によってシリンダ体1内に区画される同一断面積の伸び側油室R1および縮み側油室R2が外部に配在の減衰バルブVを介して相互に連通されると共に、外部に配在のアキュムレータAに連通されてなるとしている。

【0014】それゆえ、この張力調整ダンパD1にあっては、ロッド体2がシリンダ体1に対して出没するその伸縮時には、伸び側油室R1と縮み側油室R2との間で油が往復することになり、このとき油が必ず減衰バルブVを通過することから、所定の減衰作用、すなわち、エネルギー吸収が伸び縮みのいずれの方向でも必ず実現されることになる。

【0015】また、油温変化があつて伸び側油室R1および縮み側油室R2における体積が変化するとき、この変化分をアキュムレータAによって補償し得ることになる。

【0016】つぎに、この張力調整ダンパD1は、ロッド体2の図中で右端部となる先端部にシリンダ体1内で摺動する第二ピストン4が連設されると共に、この第二ピストン4によってシリンダ体1内に圧力室Rが区画されるとしている。

【0017】そして、この圧力室Rが上記のアキュムレータAに連通され、かつ、シリンダ体1の外部に突出するロッド体2の図中で左端となる基端に緊張体たる吊りケーブルC1が連設されるとしている。

【0018】ちなみに、圧力室Rの断面積は、図示する

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実施の形態では、伸び側油室R1および縮み側油室R2の断面積と同一となるように設定されているが、この圧力室Rの機能するところからすれば、伸び側油室R1および縮み側油室R2の断面積と異なるように設定されても良い。

【0019】それゆえ、この張力調整ダンパD1にあっては、圧力室RがアキュムレータAによって常に膨張する傾向におかれる、すなわち、アキュムレータAのエアはね力でロッド体2がシリンダ体1内に没入する収縮傾向におかれることになり、ロッド体2の基端に連設の吊りケーブルC1を常に緊張することになる。

【0020】また、吊りケーブルC1に外力が作用して、ロッド体2がシリンダ体1内から抜け出る伸長作動時には、圧力室Rが収縮されて油がアキュムレータAに流入されるようになり、したがって、アキュムレータAによるエネルギー吸収も実現されることになる。

【0021】上記した張力調整ダンパD1は、これを柱Pに連設するについては、図1に示す状態たるいわゆる最収縮状態にあるままでシリンダ体1が柱Pに連設し、爾後にロッド体2の基端に吊りケーブルC1を連設して、図2に示すように、ロッド体2をシリンダ体1内から引き出して中程度伸長した状態にする。

【0022】その結果、このいわゆる取付状態から、たとえば、吊りケーブルC1に作用する外力が増大する場合には、この吊りケーブルC1を連設させるロッド体2がシリンダ体1内から抜け出るようになり、このとき、収縮する伸び側油室R1から流出する油が減衰バルブVを介して縮み側油室R2に流入すると共に、圧力室Rが収縮されてこの圧力室Rからの油がアキュムレータAに流入することになる。

【0023】したがって、油が減衰バルブVを通過することによる減衰作用と、油がアキュムレータAに流入することによるガスはね効果で、所定のエネルギー吸収が具現化されることになる。

【0024】そして、吊りケーブルC1に作用する外力が減少する場合には、アキュムレータAによるエアはね力で圧力室Rが膨張することになり、このとき、縮み側油室R2からの油が減衰バルブVを介して伸び側油室R1に流入することになる。

【0025】それゆえ、アキュムレータAによるエアはね力で吊りケーブルC1における弛みが阻止される一方で、油が減衰バルブVを通過することによる減衰作用で、所定のエネルギー吸収が具現化され、特に、吊りケーブルC1が緩むことによる大きい張力変動を効果的に抑制し得ることになる。

【0026】つぎに、図4に示す実施の形態の張力調整ダンパD2は、緊張体たる押えケーブルC2（図6参照）における張力変動を抑制するものとして利用される。

【0027】すなわち、前記した張力調整ダンパD1

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は、テンションケーブルTcを吊り上げるように機能する吊りケーブルC1における張力変動を抑制するが、この張力調整ダンパD2は、吊りケーブルC1と対になりテンションケーブルTcを下方から押えるように機能する押えケーブルC2における張力変動を抑制するものである。

【0028】それゆえ、この張力調整ダンパD2は、基本的には、前記した図1に示す張力調整ダンパD1と同様に構成されているもので、柱Pなどの固定側に連繋されるシリンダ体1と、このシリンダ体1内に先端側が出没可能に挿通されるロッド体2と、このロッド体2の中間軸部に連設されてシリンダ体1内に摺動可能に収装されるピストン3とを有し、このピストン3によってシリンダ体1内に区画される同一断面積の伸び側油室R1および縮み側油室R2が外部に配在の減衰バルブVを介して相互に連通されると共に外部に配在のアクキュムレータAに連通され、ロッド体2の先端部にシリンダ体1内で摺動する第二ピストン4が連設されると共にこの第二ピストン4によってシリンダ体1内に圧力室Rが区画され、この圧力室Rが上記のアクキュムレータAに連通され

【0029】そして、この張力調整ダンパD2は、上記の構成に加えて、シリンダ体1の外部に突出するロッド体2の図中で左端部となる基端部内に摺動可能に収装されてサブ圧力室R3を区画するサブピストン5と、このサブピストン5に先端が連設されて図中で左端となる基端がロッド体2の外部に突出するサブロッド体6とを有し、サブ圧力室R3が外部に配在のサブアクキュムレータA1に連通され、かつ、サブロッド体6の図中で左端となる基端に緊張体たる押えケーブルC2が連繋されると

【0030】このとき、サブ圧力室R3における断面積は、前記した圧力室Rにおける断面積より小さくなるように設定されているのもちろんであり、また、サブアクキュムレータA1における封入ガス圧は、前記したアクキュムレータAにおける封入ガス圧より推力が小さくなるように設定されている。

【0031】それゆえ、この実施の形態による張力調整ダンパD2にあっては、いわゆる伸長作動時には、まず、サブロッド体6がロッド体2内から抜け出るようになり、サブロッド体6が、図5に示すように、それ以上ロッド体2内から抜け出られなくなると、同じく図5に示すように、ロッド体2がシリンダ体1内から抜け出るようになる。

【0032】また、この張力調整ダンパD2にあっては、伸長状態から収縮する場合には、ロッド体2がシリンダ体1内に没入するようになり、ロッド体2がそれ以上没入し得なくなると、サブロッド体6がロッド体2内に没入するようになる。

【0033】したがって、前記した図1に示す張力調整

ダンパD1では、収縮作動時にロッド体2がシリンダ体1内に没入し終わった後は、この張力調整ダンパD1がさらに収縮することはないが、この図4に示す張力調整ダンパD2では、ロッド体2がシリンダ体1内に没入し、終わった後のさらなる収縮作動が可能になる。

【0034】そして、この張力調整ダンパD2にあっては、これを柱Pに連繋するについては、前記した図1に示す張力調整ダンパD1と同様にするが、サブロッド体6の基端に押えケーブルC2を連繋するときは、図5に示すように、サブロッド体6をロッド体2内から引き出して最伸長状態にした上で、なおかつ、ロッド体2をシリンダ体1内から引き出して中程度伸長した状態にする。

【0035】その結果、このいわゆる取付状態から、たとえば、押えケーブルC2に作用する外力が増大する場合には、この押えケーブルC2がサブロッド体6およびサブピストン5を介して連繋するロッド体2がシリンダ体1内から抜け出るようになり、このとき、収縮する伸び側油室R1から流出する油が減衰バルブVを介して縮み側油室R2に流入すると共に、圧力室Rが収縮されてこの圧力室Rからの油がアクキュムレータAに流入することになる。

【0036】したがって、油が減衰バルブVを通過することによる減衰作用と、油がアクキュムレータAに流入することによるガスばね効果で、所定のエネルギー吸収が具現化されることになる。

【0037】そして、押えケーブルC2に作用する外力が減少する場合には、ロッド体2がシリンダ体1内に没入するようになり、このとき、収縮する縮み側油室R2から流出する油が減衰バルブVを介して伸び側油室R1に流入すると共に、圧力室Rが膨張してアクキュムレータAからの油が圧力室Rに流入することになる。

【0038】したがって、油が減衰バルブVを通過することによる減衰作用で所定のエネルギー吸収が具現化される一方で、アクキュムレータAによるエアばね力で押えケーブルC2にいわゆる弛みが発生するのを阻止することになる。

【0039】そして、ロッド体2がシリンダ体1内に没入し終わった後さらに押えケーブルC2が弛みような場合には、サブロッド体5がロッド体2内に没入するようになり、サブアクキュムレータA1によるエアばね力で押えケーブルC2における張力変動を抑制することになる。

【0040】それゆえ、この図4に示す張力調整ダンパD2は、前記した図1に示す張力調整ダンパD1といわゆる対とされてテンションケーブルTcを緊張するのに最適となる。

【0041】

【発明の効果】以上のように、この発明にあっては、伸縮作動時に油が必ず減衰バルブを通過するから、ケー

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ルからなる緊張体における張力変動を効果的に抑制し得ることになり、それゆえ、たとえば、ケーブル架構でケーブルドームなどを構築する場合に、緊張体を言わば太目に設定する必要がなく、したがって、屋根荷重を増大させたり、柱を頑丈に形成することが要請されずして、コストの低減を可能にすることになる。

【0042】そして、シリンダ体の外部に突出するロッド体の基端部に摺動可能に収装されてサブ圧力室を区画するサブピストンと、このサブピストンに先端が連設されて基端がロッド体の外部に突出するサブロッド体とを有し、サブ圧力室が外部に配在のサブアキュムレータに連通され、かつ、サブロッド体の基端に緊張体が連設されてなるとする場合には、その収縮作動時に、ロッド体がシリンダ体内に没入し終わった後さらに緊張体が弛むような場合にもサブロッド体がロッド体内に没入するようになり、サブアキュムレータによるエアばね力で緊張体における張力変動を抑制し得ることになる。

【0043】その結果、この発明によれば、いたずらなコストの上昇を招来せずして、ケーブル架構で、たとえば、ケーブルドームなどを構築する場合の利用に最適となり、その汎用性の向上を期待し得る利点がある。

【図面の簡単な説明】

【図1】この発明の一実施の形態による張力調整ダンパを原理的に示す図である。

【図2】図1の張力調整ダンパが中程度伸長した状態を図1と同様に示す図である。

【図3】図1の張力調整ダンパが最伸長した状態を図1と同様に示す図である。

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\*【図4】他の実施の形態による張力調整ダンパを図1と同様に示す図である。

【図5】図4の張力調整ダンパが僅かに伸長した状態を示す部分図である。

【図6】ケーブル架構の一例を原理的に示す部分図である。

【図7】図6に示す従来例としての張力調整ダンパを原理的に示す図である。

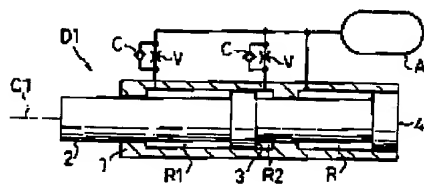
【符号の説明】

- 1 シリンダ体
- 2 ロッド体
- 3 ピストン
- 4 第二ピストン
- 5 サブピストン
- 6 サブロッド体
- A アキュムレータ
- A1 サブアキュムレータ
- C チェック弁
- C1 緊張体たる吊りケーブル
- C2 緊張体たる押えケーブル
- D1, D2 張力調整ダンパ
- R 圧力室
- R1 伸び側油室
- R2 縮み側油室
- R3 サブ圧力室
- Tc テンションケーブル
- V 減衰バルブ

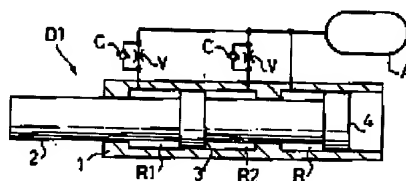
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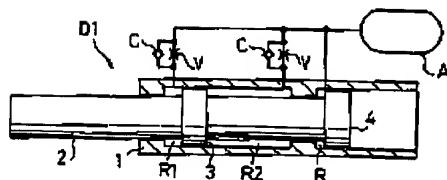
【図1】



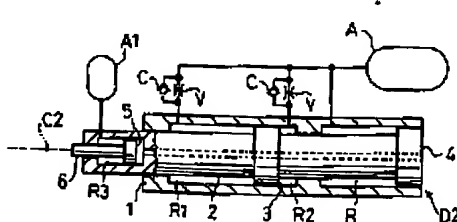
【図2】



【図3】



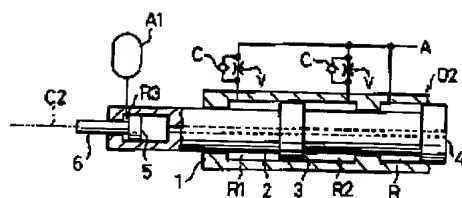
【図4】



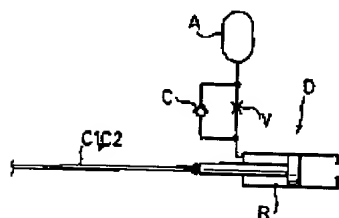
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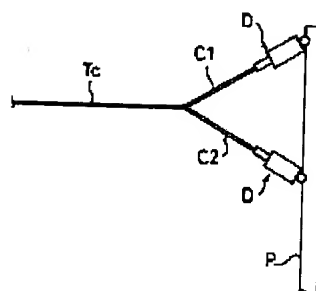
【図5】



【図7】



【図6】



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